State of the art of Morphing Detection

SOTAMD

Fons Knopjes
Senior Research & Development Advisor
The content of this presentation represents the views of the author only and is his sole responsibility. The European Commission does not accept any responsibility for use that may be made of the information it contains.
Authoritative and trusted source for identity data

- ePassport and identity card
- Civil registry (BRP)
- Unique Identity Number (BSN)
- Prevention Identity fraud
- Quality programs (e.g. address quality)
- Innovation programs (e.g. digital identity)
A Dutch citizen (born in Afghanistan) successfully applied for a Dutch passport with a morphed image provided by an asylum seeker from Afghanistan. An asylum seeker that had applied for asylum in Belgium.

The asylum seeker tried to travel via Germany to Canada on the Dutch passport but was luckily stopped at the gate.
Importance

- Scale of the problem is potentially large
- Problem is relatively new and undocumented
- Need to evaluate possible countermeasures to the current vulnerabilities of face recognition technology
- Numerous electronic passports are potentially vulnerable
Research into the application process has shown that civil servants:
- are not aware of the image morphing phenomenon, and that photographs used for the application of identity documents may be morphed;
- can easily be deceived by morphed face images;
- would accept morphed face images, which comply with the requirements of photographs for identity documents, as genuine ones.

Applications by look-a-likes were also accepted.

Expected rise in passengers
Expected rise in deployment of biometric systems
Existing vulnerability of biometric systems
Existing morphed face image attacks
SOTAMD

› Funding: European Commission Direct Award
› Timeframe: February 2019 – February 2020
› Coordinator: National Office for Identity Data

› Partners
  – Bundeskriminalamt
  – University of Bologna
  – Hochschule Darmstadt
  – The University of Twente
  – Norwegian University of Science and Technology
Focus on automated border control scenario, where a bona fide face image, taken at the border control gate, is compared against the image in the passport.
General objectives

- Select mechanisms (algorithms), especially designed to detect morphed face images so-called Morphing Attack Detection (MAD) mechanisms, and adapt and integrate these mechanisms in a to be developed MAD evaluation platform.

- Identify the state-of-the-art of these MAD mechanisms and analyse their detection accuracy on a dataset of morphed face images and bona fide face images.
Specific objectives

› Capture 150 face images with passport photo enrolment and automated border control gates
› Generate morphed face images with at least 3 algorithms
› Post-process automatically and manually
› Print and scan all morphed face images
› Adapt and integrate at least 3 MAD mechanisms
› Test the MAD mechanisms
So far...
› Database acquisition protocol
› Evaluation protocol
› Preselection of facial images

Currently working on...
› Database acquisition
› Morphing
› Evaluation platform
An open access evaluation platform to test and compare MAD mechanisms and determine whether and when a solution is mature for deployment at border gates

https://biolab.csr.unibo.it/fvcongoing

Possible to submit as .so
Contact

Fons Knopjes

fons.knopjes@rvig.nl
+31629396638

Funded by the European Union

This presentation was funded by the European Union’s Internal Security Fund — Borders and Visa.